

# HAVRE NWS AIRPORT

## HILL COUNTY

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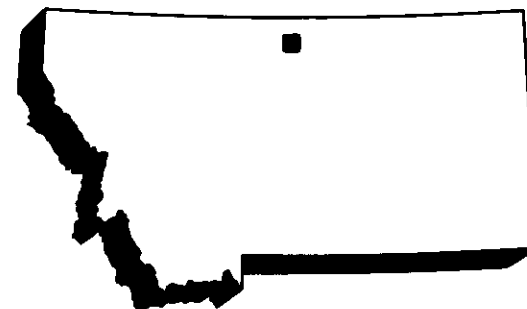
The Havre airport is located approximately 4 miles west of Havre at 48 33 00 N and 109 46 30 W (Site No. 60 on Map II-1). Elevation at the airport is 2,585 feet. Meteorological data have been collected at this site for many years by the National Weather Service.

These data, primarily collected for aviation and weather forecasting uses, consist of short-term (5 minutes or less) averages of wind speed and wind direction, as well as other meteorological parameters. Data were gathered once per hour. The data have been analyzed by Battelle Pacific Northwest Laboratories. Because of a change in reporting interval, the data set was split into two parts for analysis: February 1, 1961, through December 31, 1964; and January 1, 1967, through December 31, 1978. Data from the latter period only were selected for inclusion in the *Montana Wind Energy Atlas*.

The data set for Havre consists of summaries of observations made every third hour from January 1, 1967, through December 31, 1978. The anemometer was mounted on a ground mast at a height of 6.1 meters. The site is representative of a large area of north-central Montana.

Average annual wind speed was 10.7 miles per hour. Average monthly wind speeds ranged from 9.6 miles per hour in August to 11.6 miles per hour in April.

Average annual wind power was 135.0 watts/m<sup>2</sup>. Average monthly wind power varied from 96.0 watts/m<sup>2</sup> in August to 170.0 watts/m<sup>2</sup> in April.



**Table IV - 86**  
**Monthly Wind Speed Distribution**  
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**01/01/67 - 12/31/78**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
CALM (<1.1)	5.5	5.1	4.7	3.9	3.5	3.6	3.6	5.3	5.0	6.0	6.4	4.5	4.8	CALM (<0.5)
1.1- 3.1	0.3	0.3	0.2	0.2	0.1	0.0	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.5- 1.4
3.4- 5.4	12.6	12.7	11.9	10.5	11.4	12.7	14.1	15.1	13.8	14.3	14.5	12.6	13.0	1.5- 2.4 S
5.6- 7.6	16.4	16.2	16.9	16.4	15.5	16.7	19.3	20.4	19.2	16.0	16.6	16.7	17.2	2.5- 3.4 P
7.8- 9.8	15.5	15.4	16.0	14.7	17.1	17.2	19.0	18.6	18.5	16.6	15.6	15.3	16.6	3.5- 4.4 E
10.1-12.1	12.8	12.2	12.3	11.7	12.7	12.7	13.1	11.8	12.5	11.9	12.9	13.0	12.5	4.5- 5.4 E
12.3-14.3	9.3	10.6	10.1	10.9	10.3	11.8	10.1	8.7	9.4	10.0	7.7	9.5	9.8	5.5- 6.4 D
14.5-16.6	8.7	9.6	8.7	9.8	9.8	8.6	8.9	8.2	7.8	8.4	8.0	8.6	8.8	6.5- 7.4
16.8-18.8	6.4	7.2	7.0	8.4	7.6	6.8	5.4	5.0	6.4	6.3	6.4	6.5	6.6	7.5- 8.4 M
19.0-21.0	5.3	5.1	5.8	5.9	6.6	5.3	3.6	3.8	4.1	4.5	5.1	4.7	5.0	8.5- 9.4 E
21.3-23.3	3.0	2.9	2.8	3.0	2.4	2.1	1.2	1.2	1.4	2.5	3.0	3.7	2.4	9.5-10.4 T
23.5-25.5	1.9	0.8	1.7	1.2	1.5	1.0	0.7	0.8	0.7	1.6	1.5	1.9	1.3	10.5-11.4 E
25.7-27.7	1.4	1.1	0.9	1.7	0.5	0.7	0.6	0.4	0.5	0.6	0.9	1.5	0.9	11.5-12.4 R
28.0-30.0	0.6	0.4	0.6	1.0	0.6	0.6	0.3	0.3	0.2	0.6	0.5	0.7	0.5	12.5-13.4 S
30.2-32.2	0.2	0.3	0.2	0.2	0.2	0.1	0.0	0.1	0.1	0.3	0.5	0.3	0.2	13.5-14.4 /
32.4-34.4	0.1	0.2	0.1	0.3	0.1	0.0	0.1	0.2	0.1	0.0	0.1	0.1	0.1	14.5-15.4 S
34.7-36.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	15.5-16.4 E
36.9-38.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	16.5-17.4 C
39.1-41.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.5-18.4 O
41.4-43.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.5-19.4 N
43.6-45.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	19.5-20.4 D
45.9-56.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	20.5-25.4
57.0-68.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.5-30.4
68.2-79.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.5-35.4
79.4-90.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.5-40.4
>90.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	>40.4
AVERAGE														
SPEED (MPH)	11.0	11.0	11.0	11.6	11.2	10.7	10.1	9.6	10.1	10.5	10.5	11.2	10.7	
AVERAGE														
SPEED (M/SEC)	4.9	4.9	4.9	5.2	5.0	4.8	4.5	4.3	4.5	4.7	4.7	5.0	4.8	
AVERAGE														
WIND POWER (WATTS/M**2)	154.0	144.0	146.0	170.0	140.0	121.0	100.0	96.0	103.0	133.0	146.0	164.0	135.0	

ANEMOMETER HEIGHT = 20.0 FEET = 6.1 METERS

SOURCE: BATTELLE PACIFIC NORTHWEST LABORATORIES